

### REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Claims 1-16 are presently pending in the above-identified application. As discussed in more detail below, claims 1, 5 and 9 are amended. Accordingly, upon entry of this amendment, claims 1-16 will be pending. No new matter has been added.

#### **Summary of the telephone interview with the Examiner**

As an initial matter, Applicant wishes to thank the Examiner for the courtesy extended to Applicant's attorneys during an interview on July 26, 2004. During the interview, Applicant's attorneys presented the arguments, as set forth below in more detail, to distinguish the present invention, particularly with respect to step (b) and step (d) of the claimed process, from the cited reference (i.e., GB Application No. 2276392 ("Wilde")). An outline of the same argument and foregoing amendments to the claims were faxed to the Examiner prior to the interview. The Examiner considered Applicant's argument distinguishing step (d) from Wilde as "very strong", but indicated that he would have to consult with his supervisor regarding the argument for step (b).

#### **Rejection of Claim 1, 7 and 8 under 35 U.S.C. § 102(b)**

In the Office Action, the Examiner maintained the rejection of claims 1, 7 and 8 for being anticipated by Wilde. Specifically with respect to claim 1, the Examiner states:

**Wilde discloses a process for extracting oil from a substance by contacting the substance with a solvent comprising HFC 134a (1, 1, 1, 2-tetrafluoroethane) in a sealed first vessel which is then heated. A solution of oil and HFC 134a from the first vessel is then passed into an evaporator (a second vessel) wherein the solution is then cooled to separate oil from the solution. (See example A on pages 13-15 and claim 6). This is deemed to anticipate the limitation of claim 1.**

Applicant respectfully traverses this rejection for the following reasons. The present invention is distinguishable from Wilde in at least two aspects:

Firstly, Step (b) of claim 1 as originally filed is a heating step carried out during the extraction process. The present invention is directed to the unexpected discovery that the solvent used to extract oils out of the oil-containing substances, such as seeds, becomes a far better solvent at slightly elevated temperature (*see*, the last paragraph on page 6 of the specification). The heating during the extraction process thus greatly enhances the solubility of the oil into the solvent, which also makes it more effective for the oil to precipitate in step (d) that follows. Step (b) of Claim 1 is being amended to clearly point out that the temperature is elevated in the first vessel to “allow for the oil to be extracted to the solvent”.

In contrast, Wilde does NOT disclose a heating step during the extraction process. The extractor, i.e., the vessel containing the substance from which the oil is extracted, is merely tumbled to facilitate the contact of the solvent and the substance (*see*, the first full paragraph on p. 14 of Wilde). The extractor is only optionally heated after the oil has been removed (*see*, the fifth full paragraph on page 15 of Wilde). The purpose of this “heating step” is to recover any residual solvent from the extractor in order to reuse such solvent. In other words, the “heating step” in Wilde has nothing to do with the extraction of the oil, particularly since the desired oil has been removed from the extractor prior to any heating (*see*, *id.*).

During the interview, the Examiner stated that there “must be some oil left in the extractor”, and therefore the heating of the extractor meets the limitation of step(b) of the currently claimed process. Applicant respectfully submits that Wilde does not, in any way, teach or indicate that there is still residual oil in the extractor after the oil has been removed. The Examiner has not provided any evidence to substantiate his statement that oil would be present in the extractor during the heating step in Wilde, despite specific disclosure in Wilde stating that “following the removal of the rose oil”, the residual solvent in the extractor continues to be pumped out, during which process the extractor may be heated to improve the solvent recovery (*see*, the fifth and sixth full paragraph on page 15 of Wilde.) Even assuming, *argumendo*, that some oil does remain in the extractor “following the removal of the rose oil”, the “heating step” disclosed in Wilde leads to the removal of any residual solvent. With the solvent gone, the heating step will not be able to allow the residual oil to be extracted from the substance to the solvent as set forth in the instant claims. Accordingly, regardless of whether there is still oil in

the extractor after the oil removal, the fact remains that Wilde fails to disclose a heating step during the oil extraction. The “heating” disclosed in Wilde is merely to accomplish the solvent recovery after the oil has already been extracted and removed.

Secondly, Step (d) of claim 1 as amended further clarifies that a cooling step of the second vessel allows for the extracted oil to precipitate. Again, the principle behind this step lies in the fact that the solvent of the present invention is a superb solvent toward the oil to be extracted at an elevated temperature, but becomes a very poor solvent when the temperature is lowered. The significant decrease of the oil solubility during the cooling step results in the oil being precipitated out of the solution.

In contrast, Wilde does NOT disclose a cooling step in its attempt to obtain the oil. The Examiner remarked in his “response to argument” that the evaporator in Wilde was “cooled to room temperature” and this “meets the claimed limitation” (*see*, p. 8 of the Office Action). However, our study of Wilde indicates that it was the compressor that was cooled to room temperature, not the evaporator (*see*, last sentence of the first full paragraph, and the second full paragraph on p. 14 of Wilde). In Wilde, after the solution containing the oil was transferred from the extractor to the evaporator, the evaporator was connected to a compressor. The solvent in the evaporator is then pumped into the compressor, which is then cooled to room temperature to allow the gaseous solvent to return to its liquid phase in order to be reused. The evaporator, on the other hand was not cooled, but “heated” to maintain a temperature at which the solvent can be effectively pumped out.

During the telephone interview, the Examiner further pointed out an alternative “cooling step”, in which the “evaporator cooled to very low temperature” (*see*, fourth paragraph on page 14 of Wilde). Applicant respectfully submits that Wilde teaches a “heating” step, not a “cooling” step, based on the fact that during the solvent evaporation, the “evaporator” would in theory cool to very low temperature unless it is “heated” during this process. Indeed, Wilde places the evaporator in a water bath furnished with an immersion heater and thermostat. In other words, Wilde does not allow the evaporator to cool. On the contrary, Wilde teaches one skilled in the art that the evaporator is to be heated in order to prevent it from cooling to a temperature at which the solvent evaporation is no longer efficient.

Anticipation requires that each and every element of an invention is disclosed in a cited prior art reference. Applicant respectfully submits that Wilde fails to disclose either step (b) or step (d), and furthermore, Wilde fails to disclose the process as a whole, i.e., step (a) through step (b). Accordingly, the claimed process, as set forth in claim 1, cannot be anticipated by the teachings in Wilde.

With respect to claim 7, the Examiner states:

**Wilde discloses that the second vessel (evaporator) is cooled to very low temperature and it is desirable to immerse the second vessel in a water bath furnished with an immersion heater and thermostat. The thermostat is set to activate the immersion heater when the water temperature fell to 10°C and to switch off the heater whenever the temperature of water exceeded 12°C. This is deemed to anticipate the limitation of claim 7. (See page 14; lines 21-26)**

Applicant respectfully traverses this rejection for the following reason. As discussed above, Wilde fails to disclose a cooling step in obtaining the oil. On the contrary, a heating step has to be carried out in Wilde to ensure that the evaporator does NOT cool off during the solvent evaporation process. Specifically, Wilde teaches that the evaporator is to be placed in a water bath in which a heater and a thermostat help to control the temperature at between 10-12°C.

In contrast, in the claimed process, the oil is first extracted into a solvent at an elevated temperature, e.g., 40-60°C, (*see*, claim 6), where upon the solubility of the oil is much greater than that at room temperature or lower. The solution in the second vessel is then cooled to the range of 25°C (about room temperature) to -10°C, where upon the significantly reduced solubility of the oil leads to its precipitation from the solution.

Because Claim 1 as amended is not anticipated by Wilde in that Wilde does not disclose the cooling step of step (d), claim 7, which is dependent from claim 1, is also not anticipated by the teachings of Wilde.

With respect to claim 8, the Examiner contends that it is anticipated by claim 7 of Wilde, which recites that seeds are among the natural products from which the oil may be extracted and recovered by an evaporation process. Applicant respectfully traverses. Claim 8 of the present invention contains further limitation of claim 1. Specifically, claim 8 recites the

types of substances, such as seed from which the oil can be extracted and recovered by a precipitation process. Since claim 1 has been shown to not be anticipated by the teachings of Wilde, Applicant respectfully submits that claim 8, which is dependent upon claim 1, is also not anticipated by the teachings in Wilde.

#### **Rejection of Claims 1-15 under 35 U.S.C. § 103 (c)**

The Examiner rejected claim 6 for being obvious over Wilde. Specifically, the Examiner states:

**Wilde does not specifically disclose that the first vessel is heated to a temperature of from 40 to 60°C. However, Wilde teaches that in order to improve the recovery of solvent, it is necessary to introduce heat to the extractor and its contents (see the last paragraph on page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Wilde by heating the first vessel at the claimed temperature because one of skill in the art would employ any temperature (including the claimed pressure) that would enhance the recovery of solvent in the second vessel and it would be expected that the results would be the same or similar when operating the first vessel at either 39°C or 40°C.**

Applicant respectfully traverses this rejection for the following reasons. Claim 6 of the present invention is ultimately dependent from claim 1. As discussed above, the "heating step" in Wilde is not directed to oil extraction; instead, it is directed to solvent recovery only after the oil has already been extracted and removed. Accordingly, the heating step in claim 1 is fundamentally distinguishable from the "heating step" disclosed in Wilde, particularly since Wilde does not teach or suggest that the "heating step" disclosed therein is used for extracting the oil. Accordingly, Wilde cannot render obvious the process as set forth in claim 1, and certainly not the temperature range as set forth in claim 6. Applicant therefore respectfully requests the withdrawal of this rejection.

The Examiner rejected claims 1-16 for being obvious over PCT Application No. WO 95/26794 by Powell et al. ("Powell") in view of Wilde. Specifically with respect to claims 1 and 11, the Examiner states:

**Powell does not specifically disclose a step of heating the first vessel by a heating means and a step of cooling the second vessel. However, Wilde**

**discloses a process of extracting oil from a substance wherein the first vessel is heated and the second is cooled to release oil from solution (see Wilde: the third and fourth paragraphs in page 14 and the last paragraph in page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell to heat the first vessel by a heating means and to cool the second vessel as claimed because heating the first vessel would improve the recovery of solvent and cooling the second vessel would enhance the separation of solvent from the extracted oil.**

Applicant respectfully traverses this rejection for the following reasons. Both Powell and Wilde teach the recovery of extracted components by means of the evaporation of the solvent (*see, e.g., p. 7-8 in Powell*). As discussed above, Wilde does NOT disclose a cooling step, but rather a heating step to prevent the evaporator from cooling off during the solvent evaporation. The Examiner has indicated in the above quotation that Powell does not specifically disclose a cooling step either. Accordingly, Applicants respectfully submits that the deficiency of Powell in rendering the present invention obvious is not compensated by the disclosure of Wilde, because neither reference suggests or teaches a cooling step of the instant invention for precipitating the oil from the solution.

With respect to claims 2-5, the Examiner states:

**The co-solvent is dimethyl ether (DME). Since the co-solvent of Powell is the same the claimed co-solvent, it is inherent that the co-solvent of Powell is liquid at room temperature. (See examples 1-2)**

Applicant respectfully traverses this rejection for the following reasons. As discussed above, claim 1 of the present invention is not rendered obvious by Powell and/or Wilde. Claims 2-5 are dependent upon claim 1 and are directed to the specific types of the co-solvents as recited in step (a) of claim 1. Accordingly, Applicants respectfully submits that for the same reasons that claim 1 is not obvious in view of the teachings of Powell and/or Wilde, claims 2-5 are also not rendered obvious by the same teaching.

With respect to claims 6, the Examiner states:

**Both Powell and Wilde do not disclose that the first vessel is heated to a temperature of from 40 to 60°C. However, Wilde teaches that in order to improve the recovery of solvent, it is necessary to introduce heat to the extractor and its contents (see the last paragraph in page 15). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by**

**heating the first vessel at the claimed temperatures because one of skill in the art would heat the first vessel at any temperature (including the claimed temperature) to enhance the recovery of solvent in the second vessel and it would be expected that the results would be the same or similar when heating the first vessel either at 39°C or 40°C.**

Applicant respectfully traverses the rejection for the following reasons. Claim 6 of the present invention is dependent upon claims 1-5 and further limits the invention by specifying a temperature range within which the extraction process can be carried out. As discussed above, because claims 1-5 are not rendered obvious by the teachings of Powell and/or Wilde, Applicant respectfully submits that claim 6 is also not rendered obvious by the same teachings.

With respect to claim 7, the Examiner states:

**Powell does not disclose that the second vessel is cooled to a temperature of from -10°C to 25°C. However, Powell discloses that the distillation (evaporation) is carried out at a relative low temperature and the evaporation of the extraction solvent is aided by immersing the lower half of the evaporation chamber in an ambient temperature (which is about 20-24°C) water bath. The examiners position is that the second vessel (evaporator) is cooled to a temperature within the claimed ranges. (See page 7, lines 2-11; page 9, lines 3-6)**

Applicant respectfully traverses the rejection for the following reasons. The distillation process disclosed in Powell is carried out at relatively low temperature because the solvents used therein are generally solvents of low boiling points (*see, e.g., Powell, p. 6, line 34*). The process still requires *heating* in the sense that if the oil-solvent system is not maintained at a certain temperature, evaporation of the solvent will significantly lower the temperature and reduces the speed of any further evaporation. As the Examiner has correctly pointed out, the evaporation chamber in Powell has to be immersed in a water bath to maintain such a temperature range. In contrast, the temperature range recited in claim 7 of the present invention is one for *cooling* the oil-solvent system, during which the oil will precipitate and thus becomes separate from the solvent. Accordingly, Applicant respectfully submits that claim 7 is not rendered obvious by the teachings of Powell because there is no suggestion or disclosure in Powell that would motivate one skilled in the art to recover the oil by cooling.

With respect to claim 8, the Examiner contends that it is rendered obvious by the teachings of Powell. As discussed above, Powell does not render the present invention obvious because the present invention is directed to a process of oil-recovery by cooling and precipitation. This process is not suggested or disclosed by Powell which teaches an oil-extraction/recovery process that involves distillation of the solvent by heating.

With respect to claim 9, the Examiner states:

**The process of Powell including an apparatus system is as discussed above. Powell further discloses that the two vessels are connected by pipe work wherein the solution from the first vessel, which comprises a filtering means, is passed to the second vessel which is associated with a cooling means. Both vessels have an inlet and an outlet wherein the first vessel and second vessel are associated with each other by a valve. (See pages 7-10)**

**Powell does not specifically disclose that the second vessel has its own closable valves. However, it appears that both inlet and outlet of the second vessel should be closed when the transferring of liquid or substance in or out of the vessel is completed (see pages 7 and 8). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by employing at least one closable valve for the second vessel as claimed because a closable valve is a device that have both function for either opening or closing when it is needed.**

Applicant respectfully traverses the rejection for the following reasons. As discussed above, the distillation process disclosed in Powell requires the presence of a *heating* means in association with the second vessel. The second vessel is not actively *cooled*, as interpreted by the Examiner, but rather actively *warmed* to enhance the evaporation of the solvent. In contrast, the second vessel in the present invention is in association with a *cooling* means which allows for the precipitation of the oil, thereby avoiding the evaporation process. This feature of the apparatus is not suggested in Powell, because it would have been counter-productive to the purpose of distilling the solvent. Accordingly, Applicant respectfully submits that the apparatus of claim 9 is not rendered obvious by Powell.

With respect to claim 10, the Examiner states:

**Powell does not disclose that the valves are a one way valve which arranged as claimed. However, The flowing of the solvent and the solvent/oil solution within the process of Powell is a one way flow (See pages 7-9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell/Wilde by**



**utilizing one-way valves and arrange them in the modified process as claimed because it would be effective to use one way valves in the one-way process of Powell.**

Applicant respectfully traverses the rejection for the following reasons. Claim 10 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 10 merely further limits claim 1 by reciting the specifics of the valves. However, the essential components of the present invention are still within the scope of claim 1, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 10 is not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claims 12-13, the Examiner contends that the features recited are rendered obvious by Powell. As discussed above, the present invention differs fundamentally from the apparatus disclosed in Powell. Claims 12 and 13 merely further limit claim 1 by specifying how the solvent is introduced during the extraction and subsequently removed after the oil precipitation. However, the essential components of the present invention are still within the scope of claim 1, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claims 12-13 are not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claim 14, the Examiner states:

**Powell does not disclose that the apparatus includes means for determining the temperature of the first and second vessels. However, Powell discloses that it is important to operate the second vessel at room temperature or lower (see page 7, lines 2-11) and the first vessel of the modified process of Powell comprises a heating means. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Powell/Wilde by employing a means for determining the temperature of the first and second vessels because it is critical to regulate the temperatures of the first and second vessels at predetermined temperatures.**

Applicant respectfully traverses the rejection for the following reasons. Claim 14 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus

disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 14 merely further limits claim 1 by reciting means of regulating the pressure and temperature of the apparatus in order to optimize the extraction and precipitation processes. However, the essential components of the present invention are still within the scope of claim 1, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 14 is not rendered obvious by Powell, either alone or in combination with Wilde.

With respect to claim 15, the Examiner states:

**The first and second vessels of Powell are transparent pressure vessels because Powell discloses that the solvent liquid containing the extract is transferred from the extraction apparatus to the evaporation chamber by depressing the valve which is forced the solvent liquid transfer into the evaporation chamber (see the last paragraph on page 8). Powell does not disclose that the vessels capable of withstanding pressures of not more than 25 bar. However, both of the vessels of Powell would operate under a certain pressure (it appears that the pressure would be around 1 bar). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Powell by employ vessels capable of withstanding pressure of not more than 25 bar (e.g., 5 or 10 bar) because such vessels would effective to hold their contents during the process.**

Applicant respectfully traverses the rejection for the following reasons. Claim 15 is dependent upon claim 1, which, as discussed above, differs fundamentally from the apparatus disclosed in Powell. The crucial difference lies in that the apparatus of the present invention comprises a second vessel which is in association with a *cooling* means, whereas the apparatus disclosed in Powell is necessarily in association with a *heating* means. Claim 15 merely further limits claim 1 by reciting the capability of the apparatus to withstand certain pressure. However, the essential components of the present invention are still within the scope of claim 1, and as discussed above in detail, are still distinguishable from the teachings of Powell. Accordingly, Applicant respectfully submits that claim 15 is not rendered obvious by Powell, either alone or in combination with Wilde.


In conclusion, Applicant respectfully submits that the teachings of Wilde and Powell, either alone or taken together, do not render the instant invention obvious. In particular, neither references discloses or suggests that use of an active cooling step in the process of obtaining the desired product.

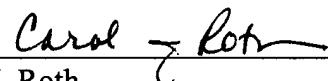
The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

A good faith effort has been made to place this application in condition for allowance. However, should any additional issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the matter.

Respectfully submitted,

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